

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year)
 01 December 2000 (01.12.00)

International application No.
 PCT/FI00/00187

Applicant's or agent's file reference
 49489

International filing date (day/month/year)
 10 March 2000 (10.03.00)

Priority date (day/month/year)
 10 March 1999 (10.03.99)

Applicant

VIALEN, Jukka et al

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 03 October 2000 (03.10.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Claudio Borton

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

BERGGREN OY AB
P.O. Box 16
FIN-00101 Helsinki
FINLANDE*Berggren Oy Ab*

22-09-2000

pkk/sk

Date of mailing (day/month/year) 14 September 2000 (14.09.00)		IMPORTANT NOTICE	
Applicant's or agent's file reference 49489			
International application No. PCT/FI00/00187	International filing date (day/month/year) 10 March 2000 (10.03.00)	Priority date (day/month/year) 10 March 1999 (10.03.99)	
Applicant NOKIA NETWORKS OY et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AU,DZ,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,
GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,
NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
14 September 2000 (14.09.00) under No. WO 00/54522

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ EPO

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA

Date of receipt of DEMAND

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION

Applicant's or agent's file reference

49489/SKU/PKK

International application No.

PCT/FI00/00187

International filing date (day/month/year)

10 March 2000 (10.03.00)

(Earliest) Priority date (day/month/year)

10 March 1999 (10.03.99)

Title of invention

A CELL SELECTION METHOD

Box No. II APPLICANT(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

NOKIA NETWORKS OY
P.O. Box 300, FIN-00045 NOKIA GROUP, Finland

Telephone No.:

Facsimile No.:

Teleprinter No.:

State (that is, country) of nationality:

Finland

State (that is, country) of residence:

Finland

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

VIALEN, Jukka
Tyrskykuja 3 b 13, FIN-02320 ESPOO, Finland

State (that is, country) of nationality:

Finland

State (that is, country) of residence:

Finland

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

LONGONI, Fabio
Visamäki 5 E 38, FIN-02130 ESPOO, Finland

State (that is, country) of nationality:

Italy

State (that is, country) of residence:

Finland

☒ Further applicants are indicated on a continuation sheet.

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet should not be included in the demand.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

HONKASALO, Zhi-Chun
Martankuja 10, FIN-02700 KAUNIAINEN, Finland

State (that is, country) of nationality:

Great Britain

State (that is, country) of residence:

Finland

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

State (that is, country) of nationality:

State (that is, country) of residence:

☐ Further applicants are indicated on another continuation sheet.

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*BERGGREN OY AB
P.O. Box 16, FIN-00101 HELSINKI, Finland

Telephone No.:

+358 9 693 701

Facsimile No.:

+358 9 693 3944

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☐ the international application as originally filed

the description

☐ as originally filed☐ as amended under Article 34

the claims

☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34

the drawings

☐ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English☒ which is the language in which the international application was filed.☒ which is the language of a translation furnished for the purposes of international search.☒ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (<i>specify</i>) | : | sheets |

For International Preliminary
Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney, reference number, if any: | 6. <input type="checkbox"/> other (<i>specify</i>): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

BERGGREN OY AB

Sirpa Kuisma

Sirpa Kuisma
Patent Agent

HELSINKI, Finland 3 October 2000

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PCT

CHAPTER II

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">International application No.</td> <td>PCT/FI00/00187</td> </tr> <tr> <td>Applicant's or agent's file reference</td> <td>49489/SKU/PKK</td> </tr> </table>	International application No.	PCT/FI00/00187	Applicant's or agent's file reference	49489/SKU/PKK	<div style="border: 1px solid black; padding: 5px;"> For International Preliminary Examining Authority use only </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Date stamp of the IPEA </div>
International application No.	PCT/FI00/00187				
Applicant's or agent's file reference	49489/SKU/PKK				
Applicant NOKIA NETWORKS OY					
Calculation of prescribed fees					
1. Preliminary examination fee	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">EUR 1533</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-left: 5px;">P</div>				
2. Handling fee <i>(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)</i>	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">EUR 147</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-left: 5px;">H</div>				
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">EUR 1680</div>				
<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">TOTAL</div>					
Mode of Payment					
<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash				
<input type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps				
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons				
<input type="checkbox"/> bank draft	<input checked="" type="checkbox"/> other (specify): Bank transfer to account 200118-182076				
Deposit Account Authorization <i>(this mode of payment may not be available at all IPEAs)</i>					
The IPEA/ <u>EPO</u> <input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.					
<input type="checkbox"/> <i>(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)</i> is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.					
Deposit Account Number	Date (day/month/year)				
Signature					

PCT REQUEST

Original (for SUBMISSION) - printed on 10.03.2000 09:10:26 AM

49489

0	For receiving Office use only	
0-1	International Application No.	
0-2	International Filing Date	
0-3	Name of receiving Office and "PCT International Application"	
0-4	Form - PCT/RO/101 PCT Request	
0-4-1	Prepared using	PCT-EASY Version 2.90 (updated 08.03.2000)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	National Board of Patents and Registration (Finland) (RO/FI)
0-7	Applicant's or agent's file reference	49489
I	Title of invention	A CELL SELECTION METHOD
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	NOKIA NETWORKS OY
II-5	Address:	P.O. Box 300 FIN-00045 Nokia Group Finland
II-6	State of nationality	FI
II-7	State of residence	FI
II-8	Telephone No.	+358-9-51121
II-9	Facsimile No.	+358-9-51168080
III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	VIALEN, Jukka
III-1-5	Address:	Tyrskykuja 3 b 13 FIN-02320 Espoo Finland
III-1-6	State of nationality	FI
III-1-7	State of residence	FI

PCT REQUEST

49489

Original (for SUBMISSION) - printed on 10.03.2000 09:10:26 AM

III-2	Applicant and/or inventor	
III-2-1	This person is:	applicant and inventor
III-2-2	Applicant for	US only
III-2-4	Name (LAST, First)	LONGONI, Fabio
III-2-5	Address:	Visamäki 5 E 38 FIN-02130 Espoo Finland
III-2-6	State of nationality	IT
III-2-7	State of residence	FI
III-3	Applicant and/or inventor	
III-3-1	This person is:	applicant and inventor
III-3-2	Applicant for	US only
III-3-4	Name (LAST, First)	HONKASALO, Zhi-Chun
III-3-5	Address:	Martankuja 10 FIN-02700 Kauniainen Finland
III-3-6	State of nationality	GB
III-3-7	State of residence	FI
IV-1	Agent or common representative; or address for correspondence The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name	BERGGREN OY AB
IV-1-2	Address:	P.O. Box 16 FIN-00101 Helsinki Finland
IV-1-3	Telephone No.	+358-9-693701
IV-1-4	Facsimile No.	+358-9-6933944
IV-1-5	e-mail	email.box@berggren.fi
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW SD SL SZ TZ UG ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT

PCT REQUEST

49489

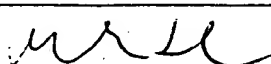
Original (for SUBMISSION) - printed on 10.03.2000 09:10:26 AM

V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AL AM AT AU AZ BA BB BG BR BY CA CH&LI CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW	
V-5	Precautionary Designation Statement In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.		
V-6	Exclusion(s) from precautionary designations	NONE	
VI-1	Priority claim of earlier national application		
VI-1-1	Filing date	10 March 1999 (10.03.1999)	
VI-1-2	Number	990526	
VI-1-3	Country	FI	
VI-2	Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1	
VII-1	International Searching Authority Chosen	European Patent Office (EPO) (ISA/EP)	
VIII	Check list	number of sheets	electronic file(s) attached
VIII-1	Request	4	-
VIII-2	Description	8	-
VIII-3	Claims	1	-
VIII-4	Abstract	1	49489.txt
VIII-5	Drawings	2	-
VIII-7	TOTAL	16	
	Accompanying items	paper document(s) attached	electronic file(s) attached
VIII-8	Fee calculation sheet	✓	-
VIII-9	Separate signed power of attorney	✓	-
VIII-10	Copy of general power of attorney	✓	-
VIII-16	PCT-EASY diskette	-	diskette
VIII-17	Other (specified):	Copy of Official Action in FI 990526	-
VIII-18	Figure of the drawings which should accompany the abstract	4	
VIII-19	Language of filing of the International application	English	

PCT REQUEST

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IX-1	Signature of applicant or agent	
IX-1-1	Name	BERGGREN OY AB
IX-1-2	Name of signatory	Markus Levlin
IX-1-3	Capacity	Patent Agent

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/EP
10-6	Transmittal of search copy delayed until search fee is paid	

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	
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PCT (ANNEX - FEE CALCULATION SHEET)

49489

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(This sheet is not part of and does not count as a sheet of the international application)

0	For receiving Office use only	
0-1	International Application No.	
0-2	Date stamp of the receiving Office	
0-4	Form - PCT/RO/101 (Annex)	
0-4-1	PCT Fee Calculation Sheet Prepared using	PCT-EASY Version 2.90 (updated 08.03.2000)
0-9	Applicant's or agent's file reference	49489
2	Applicant	NOKIA NETWORKS OY, et al.
12	Calculation of prescribed fees	fee amount/multiplier total amounts (FIM)
12-1	Transmittal fee T	⇒ 800
12-2	Search fee S	⇒ 5 618,71
12-3	International fee Basic fee (first 30 sheets) b1	2 431,8
12-4	Remaining sheets	0
12-5	Additional amount (X)	53,51
12-6	Total additional amount b2	0
12-7	b1 + b2 = B	2 431,8
12-8	Designation fees Number of designations contained in international application	84
12-9	Number of designation fees payable (maximum 8)	8
12-10	Amount of designation fee (X)	523,22
12-11	Total designation fees D	4 185,76
12-12	PCT-EASY fee reduction R	-749,16
12-13	Total International fee (B+D-R) I	⇒ 5 868,4
12-14	Fee for priority document Number of priority documents requested	1
12-15	Fee per document (X)	422
12-16	Total priority document fee P	⇒ 422
12-17	TOTAL FEES PAYABLE (T+S+I+P)	⇒ 12 709,11
12-19	Mode of payment	cheque

VALIDATION LOG AND REMARKS

13-2-6	Validation messages Contents	Green? Reference number for attached copy of general power of attorney not indicated.
13-2-7	Validation messages Fees	Green? Please verify that modified fee amounts are correct.

Original (for **SUBMISSION**) - printed on 10.03.2000 09:10:26 AM**PCT-EASY INFORMATION SHEET**

(For applicant use only, DO NOT submit this sheet with the international application)

VALIDATION LOG

	Contents
Green?	Reference number for attached copy of general power of attorney not indicated.
	Fees
Green?	Please verify that modified fee amounts are correct.

Before submitting the International Application, please carefully verify that:

- the information contained on printed Request form is correct;
- Box IX of the Request form has been signed;
- all elements of the international application as indicated in Box VIII of the Request form have been attached; and,
- the diskette containing the PCT-EASY zip file of the International Application has been enclosed and has been clearly labeled "PCT-EASY", with the applicant's or agent's file reference, and the first applicant's name.

ATTENTION

DO NOT modify any indications on the Request form printout. The attached PCT-EASY application has been locked. If an error or an omission is discovered at this time, you must copy the submitted application as a template and make the change or correction in a new application (using the submitted application as a template). You may create such a template by copying the submitted application from the "Stored Forms" folder to the "New PCT Forms" folder. Open the new (.OWO) file created in the "New PCT Forms" folder, correct the errors and proceed with the submission process again.

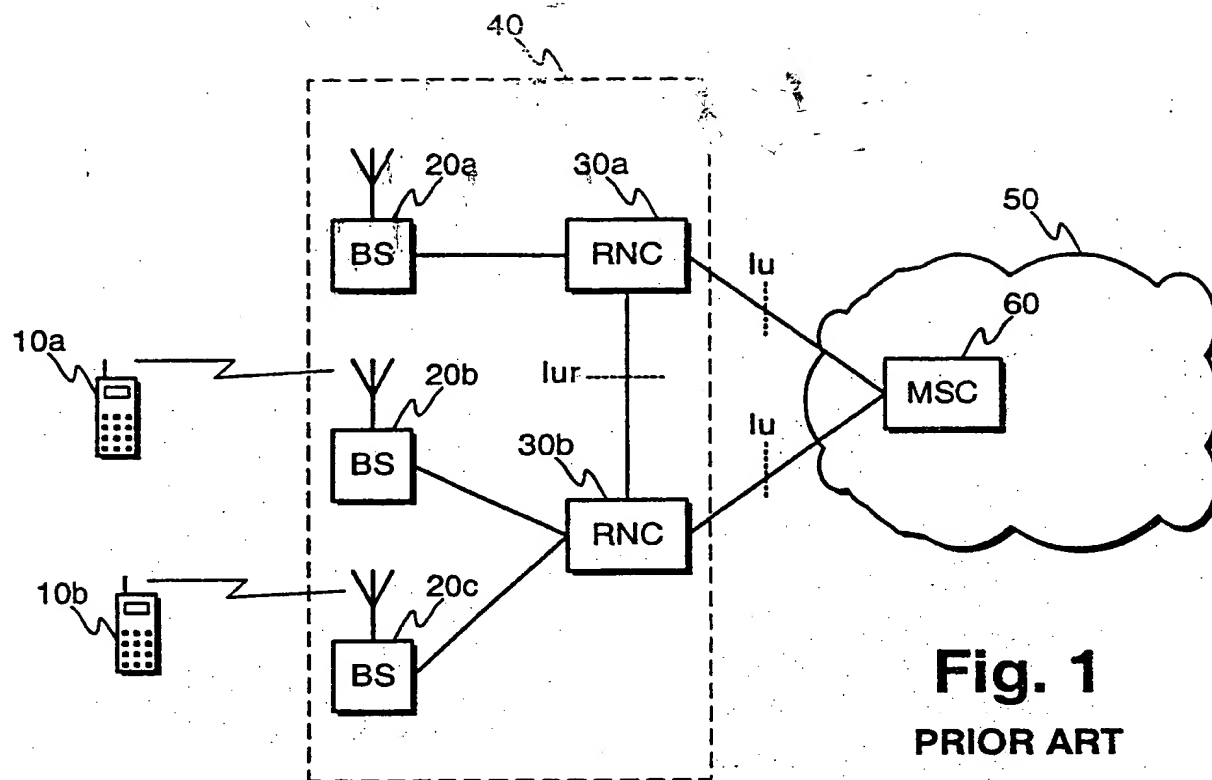


Fig. 1
PRIOR ART

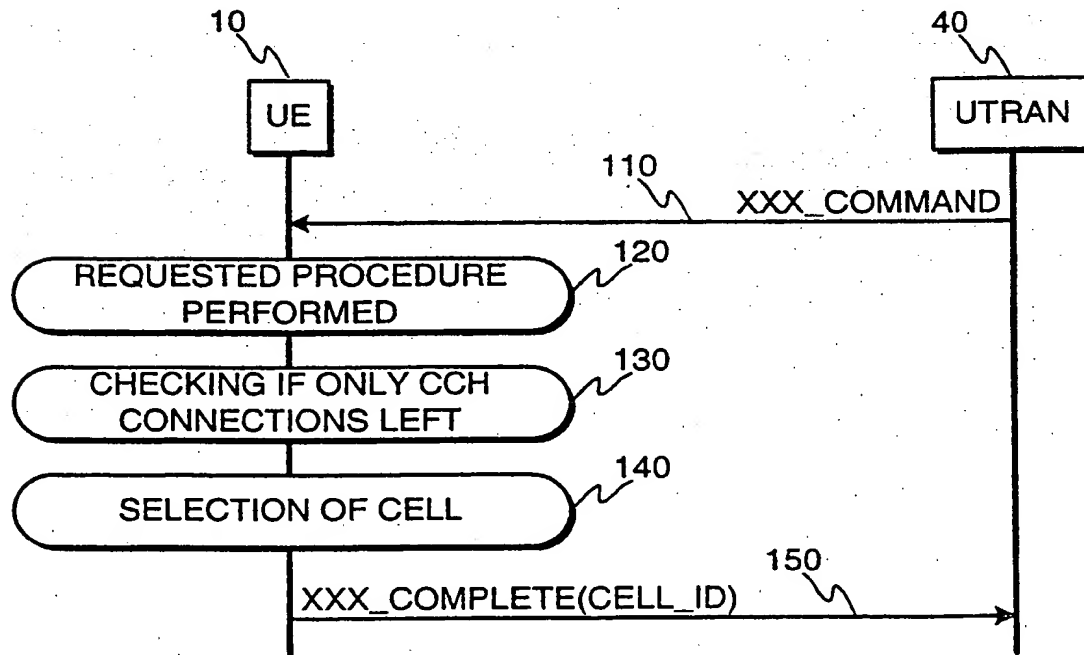


Fig. 2

09/914307

2/2

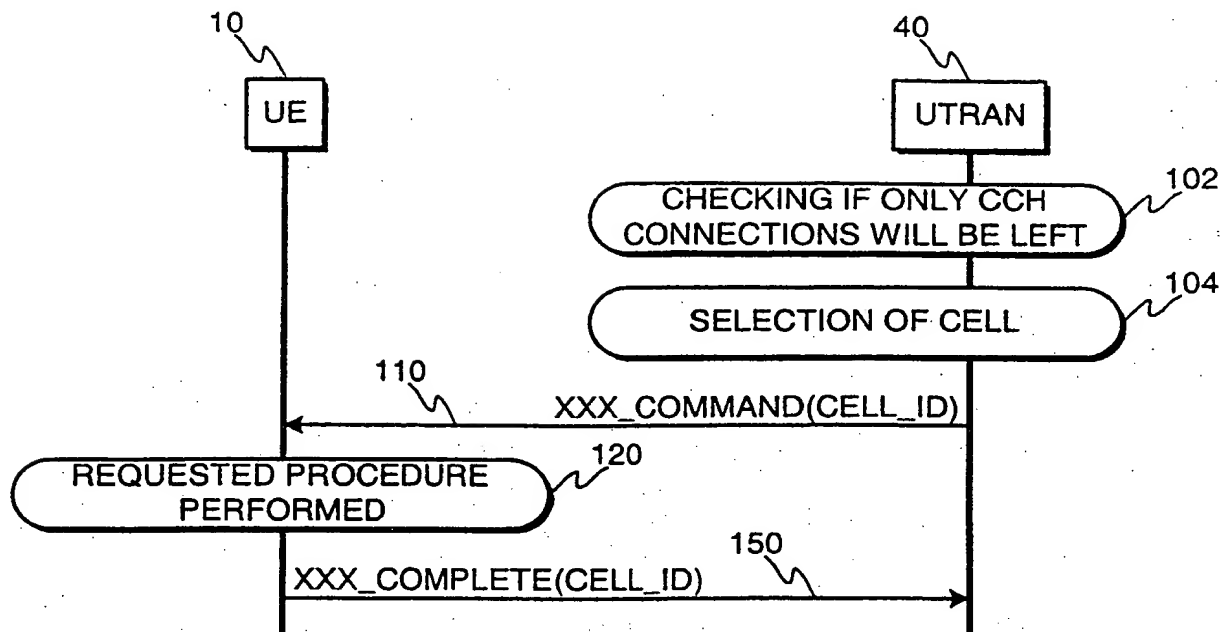


Fig. 3

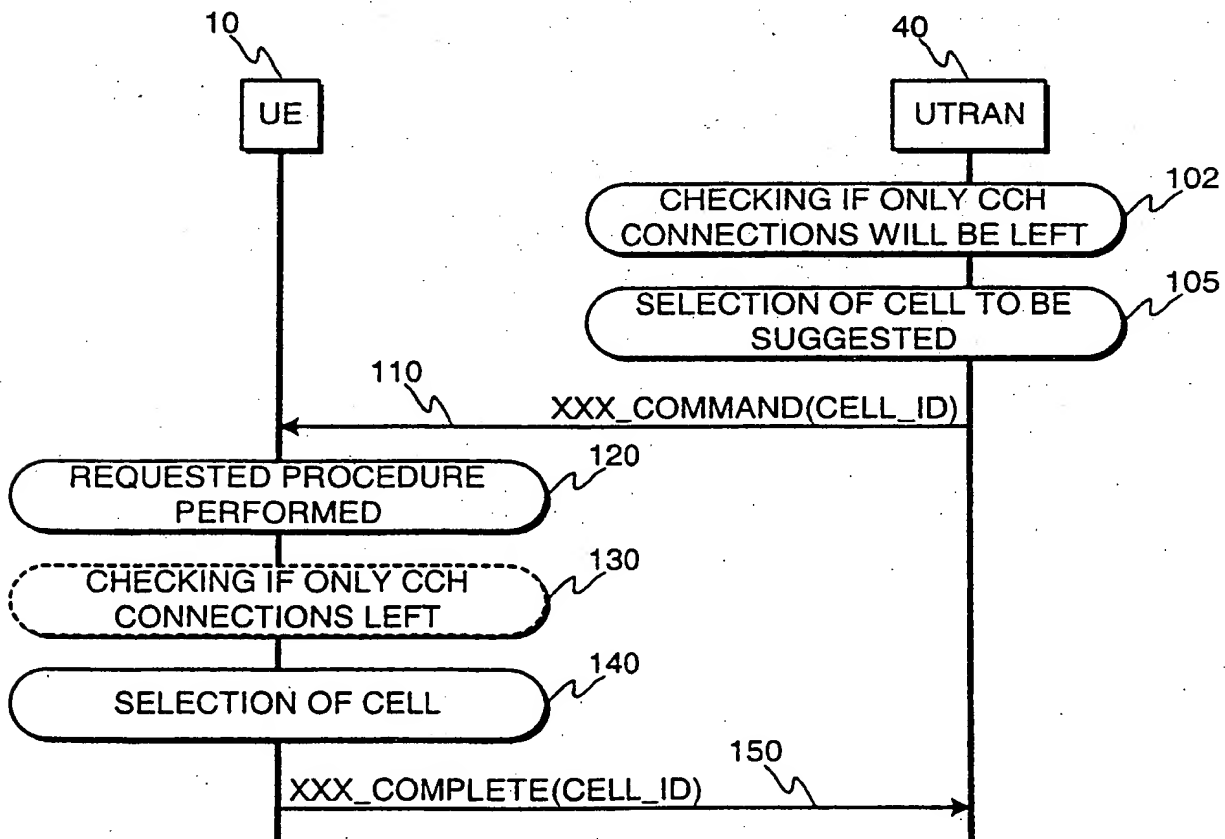


Fig. 4

A cell selection method**TECHNICAL FIELD OF THE INVENTION**

5 The invention is directed to a method for cell selection in a cellular telecommunication system. More precisely the invention is directed to a method described in the preamble of the first independent method claim.

BACKGROUND OF THE INVENTION

Some of the abbreviations used in this application are as follows:

10	CCCH	Common Control Channel
	DCCH	Dedicated Control Channel
	DRNC	Drift Radio Network Controller
	DTCH	Dedicated Traffic Channel
	FACH	Forward Link Access Channel
	IMSI	International Mobile Subscriber Identity
15	PCCH	Paging Control Channel
	PCH	Paging Channel
	PLMN	Public Land Mobile Network
	P-TMSI	Packet Temporary Mobile Subscriber Identity
	RACH	Random Access Channel
20	RNC	Radio Network Controller
	RNTI	Radio Network Temporary Identity
	RRC	Radio Resource Control
	TMSI	Temporary Mobile Subscriber Identity
	UE	User Equipment
25	UMTS	Universal Mobile Telecommunication System
	UTRAN	UMTS Terrestrial Radio Access Network

For clarification of common terms used in this document, an overview of certain cellular telecommunication system configurations is presented in the following.

30 Proposals for third-generation systems include UMTS (Universal Mobile Telecommunications System) and FPLMTS/IMT-2000 (Future Public Land Mobile Telecommunications System / International Mobile Telecommunications at 2000 MHz). In these plans cells are categorised according to their size and characteristics

into pico-, nano-, micro- and macrocells, and an example of the service level is the bit rate. The bit rate is the highest in picocells and the lowest in macrocells. The cells may overlap partially or completely and there may be different terminals so that not all terminals necessarily are able to utilise all the service levels offered by the cells.

Figure 1 shows an exemplary block diagram of a possible structure of a third generation cellular network. Such networks typically comprise a core network 50 connected to one or more radio access networks 40 (RAN). Such radio access networks are often referred to as UTRAN networks (UMTS Terrestrial Radio Access Network). The radio access networks typically comprise at least a plurality of base stations 20a,20b,20c (BS) for realizing the radio connections to mobile stations 10a,10b, and at least one radio network controller 30 (RNC) for controlling the base stations. The radio network controllers are connected to a mobile switching center (MSC) 60 in the core network.

A third generation UE can be in many different states in relation to the network. If no connections are present, the UE is in the idle mode. When at least one signalling connection exists, the UE is in connected mode. The connected mode has two main states: an URA connected state and a cell connected state. In the URA connected state, the position of the UE is known on URA (UMTS Registration Area) level. An URA consists of a plurality of cells within a certain geographical area. In the cell connected state, the position of the UE is known in the cell level. All data transmission is effected in the cell connected state.

From the viewpoint of radio resource allocation, a UE in connected mode i.e. when RRC connections exist has two main states: dedicated channel state (DCH) and common channel state (CCH).

In dedicated channel state the UE uses dedicated radio interface resources for the connection with UTRAN. There is one dedicated radio link for each cell included in the Active Set, i.e. the set of cells used by the UE. The Active Set may contain one or more cells.

In common channel state the UE shares a common channel with other users. The common channel state the UE may be in RACH/FACH or RACH/PCH substates. In RACH/FACH state the position of the UE is known at cell level, i.e. the UE is always connected to one cell. In RACH/PCH state the position of the UE is known either at cell level or at URA level.

DCH to CCH state transition may occur for example as a result of the following RRC procedures:

- Transport channel reconfiguration, in which a transport channel is changed from a dedicated to a common channel, for example for a NRT bearer.
- 5 - Radio access bearer (RAB) release, in which at least one bearer is released, and the last remaining one is a non-real time (NRT) bearer which is currently not active or is which is configured to use common channels.
- Physical channel reconfiguration, which procedure may assign, replace or release a set of physical channels used by an UE. A physical channel reconfiguration procedure may also change the used transport channel type and RRC state.
- 10 - Radio access bearer (RAB) reconfiguration, in which parameters for a radio access bearer or a signalling link are reconfigured to reflect a change in required QoS level. A RAB reconfiguration procedure may comprise for example changing of RLC parameters, changing of multiplexing priority for DTCH/DCCH, changing of DCH scheduling priority, changing of TFS for DCH, change of TFCS, assigning or releasing of physical channel(s) and changing of used transport channel types.

20 The signalling in the case of the four previous procedures is similar: they are started by the serving RNC which sends a XXX message to the UE, which replies with a XXX Complete message, in which XXX refers to the particular procedure in question.

25 In the transition from DCH to CCH - cell connected state, the cell that will be initially used in the CCH state needs to be selected and indicated. A known way of selecting and indicating the initial cell is the use of a cell update procedure started by the UE. In this method the UE selects the cell, and sends a cell update message using the RACH channel of the selected cell. The network replies by sending a cell update confirm message via the corresponding FACH channel. This solution causes too much signalling on the RACH/FACH channels. Further, the UE may not know
30 all details which affect the optimality of the cell selection. For example, the network may for various reasons prefer that the UE selects a macro cell, or a cell that is controlled by the SRNC.

3a

- Patent publication US 5,707,096, for example, discusses mobile station initiated cell update procedures in cellular telecommunication networks, where a mobile station has various common channel modes. It discloses a system and method for maintaining control channel mode status information for a mobile station. Following
- 5 reselection of a new cell by the mobile station, or selection of a new analog or digital operating mode, the system described in said publication notifies a mobile switching center of the mobile station's identity and its current control channel mode.

Another known solution is that the XXX complete message is sent by the UE on the RACH channel of the selected cell after the DCH is released. In this case the XXX Complete message should be acknowledged by the network to ensure that the message has gone through, which results in a similar signalling load as the cell update method.

SUMMARY OF THE INVENTION

An object of the invention is to realize a method, which reduces the amount of signalling associated with DCH to CCH state change. A further object of the invention is to realize a method, which allows reduction of the time needed for a DCH to CCH state change.

The objects are reached by arranging the network to suggest a cell to be used by the UE in the CCH state, and by indicating the cell as a parameter to the RRC command, which initiates the DCH to CCH state change.

The method according to the invention is characterized by that, which is specified in the characterizing part of the independent method claim. The dependent claims describe further advantageous embodiments of the invention.

According to the invention, cell identification information is attached as a parameter to a RRC message initiating the state change of the mobile station to the cell-connected state. Advantageously, the network selects a cell to be suggested as the cell for use by the mobile station in the cell-connected state, and the network indicates said cell by attaching cell identification information as a parameter to said RRC message. Consequently, the mobile station may make the final selection of the cell, and indicate the selected cell to the network by attaching cell identification information as a parameter to a second RRC message, such as the response message to the RRC message initiating the state change.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described in more detail in the following with reference to the accompanying drawings, of which

Figure 1 illustrates a network structure according to prior art,

Figure 2 illustrates signalling according to an advantageous embodiment of the invention,

Figure 3 illustrates signalling according to an advantageous embodiment of the invention, and

Figure 4 illustrates signalling according to an advantageous embodiment of the invention.

5 Same reference numerals are used for similar entities in the figures.

DETAILED DESCRIPTION

Figure 2 illustrates signalling according to an advantageous embodiment of the invention. Figure 2 shows a UE 10 and UTRAN 40, and illustrates signalling between them. In the first step 110, UTRAN sends a command XXX_COMMAND to initiate a RRC procedure, in which XXX refers to the particular procedure in question. After receiving the command, the UE performs 120 any necessary actions according to the requested procedure. In this embodiment, UE next checks 130, if only CCH connections are left. In this example, only CCH connections are found to be left after the completed RRC procedure. Consequently, the UE selects 140 a cell to be indicated as the location cell of the UE in the CCH cell connected state, and sends 150 a XXX_COMPLETE message back to UTRAN to indicate that the requested RRC procedure is complete, attaching cell identification information CELL_ID as a parameter to the XXX_COMPLETE message. Preferably, the UE sends the XXX_COMPLETE message on the DCH channel before releasing the DCH channel.

The RRC procedure referred to in the previous paragraph and in the rest of this specification with the XXX_COMMAND and XXX_COMPLETE messages may be any RRC procedure, which may result in a transition of the UE from DCH to CCH state. Examples of procedures are transport channel reconfiguration, radio access bearer (RAB) release, physical channel reconfiguration, and radio access bearer (RAB) reconfiguration, which were described in the previous description of prior art.

Figure 3 illustrates signalling according to a further advantageous embodiment of the invention. In this embodiment, the network selects the cell used in the CCH state. Before initiating the necessary RRC procedure, the network checks 102 if only CCH connections will be left after the procedure. If that is the case, as it is in this example, the network selects 104 the cell to be indicated as the location of the UE in the CCH state. Next, the network initiates the desired RRC procedure by sending 110 a XXX_COMMAND to the UE, attaching identification information of

the selected cell CELL_ID as a parameter to the XXX_COMMAND message. After receiving the XXX_COMMAND message, the UE performs 120 the requested RRC procedure, and replies by sending 150 a XXX_COMPLETE message back to the network. The UE may send the CELL_ID information as a parameter of the
5 XXX_COMPLETE message back to the network.

Figure 4 illustrates signalling according to an advantageous embodiment of the invention. In this embodiment, the network suggests to the UE the cell used in the CCH state. Before initiating the necessary RRC procedure, the network checks 102 if only CCH connections will be left after the procedure. If that is the case, as it is in
10 this example, the network selects 104 the cell to be suggested to the UE as the location of the UE in the CCH state. Next, the network initiates the desired RRC procedure by sending 110 a XXX_COMMAND to the UE, attaching identification information of the suggested cell CELL_ID as a parameter to the XXX_COMMAND message. After receiving the XXX_COMMAND message, the
15 UE performs 120 the requested RRC procedure.

In this embodiment, the UE may perform checking 130, if only CCH connections still exist after the RRC procedure. However, the inclusion of a CELL_ID parameter to the XXX_COMMAND may in various embodiments of the invention be taken as an indication, that only CCH connections are left, in which case a cell needs to be
20 selected.

Next, the UE selects the cell to be used as the location of the UE in the CCH state. The UE may take into account the suggestion of the network, if it so chooses. However, the UE may have preferences, for example set by the user of the UE, about which cells are to be preferred. Based on for example such information, the
25 UE may select another cell than the one suggested by the network. Thus the UE can select the cell from a set of cells comprising the cell indicated by the network and any other cells otherwise known by the UE, for example such as those belonging to the active set or those cells whose identification signals the UE can currently receive. After this, the UE sends 150 a XXX_COMPLETE message back to the
30 network. The UE sends identification information CELL_ID of the selected cell to the network as a parameter of the XXX_COMPLETE message.

In the previous examples, the network element originating the XXX_COMMAND messages and receiving the XXX_COMPLETE messages, i.e. the network element comprising the RRC protocol entities in the UTRAN, is typically a radio network
35 controller (RNC).

In a further advantageous embodiment of the invention, a cell of the active set i.e. of those cells in use by the UE is appointed as a default cell. In such an embodiment, the cell does not need to be identified in the XXX_COMMAND and XXX_COMPLETE message, since a default cell is already known. The communication of the default cell is in such a case effected with messaging associated with updating of the active set. This feature can in various embodiments of the invention be used in combination with the previously described features. For example, in one embodiment of the invention the network always suggests the default cell to the UE, but the UE makes the final decision by itself.

- 10 The invention reduces the amount of signalling between the UE and the network, since the selection of cell does not incur more messaging, as the known solutions do. Further, the invention reduces amount of processing in the UE and in the network, since amount of messaging is decreased. This is very important regarding the UE, since any messaging over the radio interface consumes energy, which is a critical resource in typical battery-operated mobile handsets. The invention also reduces delay in changing from DCH to CCH state, since the time spent in messaging is reduced along with the messaging.

- 15 The invention can be advantageously applied in third generation cellular systems, such as the UMTS (Universal Mobile Telecommunication System) or the IMT2000 cellular system.

- 20 In the previous embodiments, in which the network suggests or selects a cell to be used in the CCH state, the network may base the selection of the cell for example on information specific to the network, such as to select a cell under control of the serving RNC. The network may for example also select a macro cell i.e. a cell with a relatively large area to avoid the situation, in which the UE selects a microcell i.e. a cell with a very small area, in which case the network would most probably have to perform a handover for the connection or the connections of the UE very soon.

- 25 If the cell selected to be used in the CCH state is already in the active set i.e. the set of cells used by the UE when the cell selection is performed, the selected cell can in various embodiments of the invention be indicated by radio link identification information LINK_ID instead of cell identification information CELL_ID. In such a case, the network can indicate a cell to the UE by attaching the radio link identification information LINK_ID to the XXX_COMMAND message. Similarly, the UE can indicate a cell to the network by attaching the radio link identification information LINK_ID to the XXX_COMPLETE message.
- 30
- 35

5 The present invention has several advantages. For example, according to the inventive method, the UE does not need to perform signalling when entering a new cell as a result of a DCH to CCH state change. Since according to the invention, the cell to be selected is identified before the state change, no signalling is needed in the new cell for identification of the selected cell. This advantage is obtained both in embodiments, in which the UE performs the final selection, and in embodiments in which the network performs the final selection. Therefore, the amount of signalling is lower than in the solutions according to the prior art.

10 The name of a given functional entity, such as the radio network controller, is often different in the context of different cellular telecommunication systems. For example, in the GSM system the functional entity corresponding to a radio network controller (RNC) is the base station controller (BSC). Therefore, the term radio network controller is intended to cover all corresponding functional entities regardless of the term used for the entity in the particular cellular telecommunication system. Further, the various command names such as the XXX_COMMAND
15 command name are intended to be examples only, and the invention is not limited to using the command names recited in this specification.

The term mobile station is used in the claims to denote a UE or a corresponding mobile communication means.

20 In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention. While a preferred embodiment of the invention has been described in detail, it should be apparent that many modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention as defined in the appended
25 claims.

Claims

- A1
1. A method for use in a cellular telecommunications network for selection of a cell for use by a mobile station in a cell-connected state, said cellular telecommunications network comprising a plurality of radio access networks having cells, said cells being grouped into registrations areas, and said mobile station having a plurality of states, said states comprising an idle-mode state; a registration-area-connected state, the location of a mobile station in which state is known to the cellular telecommunications network on a registration area level; and a cell-connected state, the location of a mobile station in which state is known to the cellular telecommunications network on a cell level, characterised in that cell identification information is attached as a parameter to a message initiating the change of the mobile station to the cell-connected state, and in that the method comprises steps, in which
- 5
- 10
- the network selects (104, 105) a cell to be suggested as the cell for use by the mobile station in the cell-connected state, and
 - 15 - the network indicates (110) said cell by attaching cell identification information as a parameter to said message.
2. A method according to claim 1, characterized in that said message is an RRC message.
- 20
3. A method according to claim 1, characterised in that the method comprises steps, in which
- the mobile station selects (140) a cell for use in the cell-connected state, and
 - the mobile station indicates (150) the selected cell by attaching cell identification information as a parameter to a second message.
- 25
4. A method according to claim 3, characterised in that in the step, in which the mobile station selects a cell, the selection is made from a set of cells comprising cells known by the mobile station and said cell indicated by the network.
- 30
5. A method according to claim 1, characterised in that the method comprises a step, in which the network selects a cell of the active set of the mobile station to be a default cell to be suggested to the mobile station.

13 March 2001

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REPLY TO WRITTEN OPINION
INTERNATIONAL PATENT APPLICATION PCT/FI00/00187
APPLICANT: NOKIA NETWORKS OY
Due Date: 13 March 2001

As a response to the Written Opinion mailed on 13 December 2000 the claims of the patent application are amended and the prior art document D1 is identified in the description.

A new sheet 3a, to be placed between sheets 3 and 4 and identifying document D1, is enclosed. Replacement sheet 8 (clarification of the spirit of the invention statement) and replacement sheet 9 (amended claims) are also enclosed.

The original claims 1 and 2 have been combined to form an independent claim. The preamble of this amended independent claim further specifies various states of a mobile station in a cellular telecommunication network. The support for this amendment is on page 2, rows 15-22 of the description. Furthermore, the wording of the claim is changed in accordance with Item VIII, 1.1 in the Written Opinion.

New claim 2 specifies a message mentioned in claim 1 to be an RRC message. This clarifies the issue mentioned in Item VIII, 1.2 in the Written Opinion. Claim 3 is unchanged. Claim 4 depends now only on claim 3 (cf. Item VIII, 1.3), and claim 5 depends on claim 1. Reference signs are placed in parentheses in the claims, where appropriate.

As a response to item V in the Written Opinion we respectfully present the following arguments.

Document D1 and other prior documentation disclose cell update procedures, where a mobile station selects a cell autonomously. In the independent claim it is specified that the network selects a cell to be suggested as the cell for use by the mobile station in the cell-connected state and the network indicates said cell

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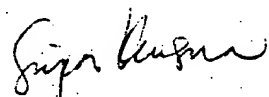
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by attaching cell identification information as a parameter to a message initiating the change of the mobile station to the cell-connected state. The idea of a network selecting a cell to be suggested to a mobile station in connection with a change of the mobile station to a cell-connected state is new and clearly different from prior art methods.

We respectfully argue that the independent amended claim specifies an inventive method, and a reconsideration of the Written Opinion is therefore requested.

BERGGREN OY AB



Sirpa Kuisma
Patent Agent

- Encls.
- Replacement sheet 3a
 - Replacement sheet 8
 - Replacement sheet 9 (Amended Claims)

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Patent publication US 5,707,096, for example, discusses mobile station initiated cell update procedures in cellular telecommunication networks, where a mobile station has various common channel modes. It discloses a system and method for maintaining control channel mode status information for a mobile station. Following
5 reselection of a new cell by the mobile station, or selection of a new analog or digital operating mode, the system described in said publication notifies a mobile switching center of the mobile station's identity and its current control channel mode.

The present invention has several advantages. For example, according to the inventive method, the UE does not need to perform signalling when entering a new cell as a result of a DCH to CCH state change. Since according to the invention, the cell to be selected is identified before the state change, no signalling is needed in the new cell for identification of the selected cell. This advantage is obtained both in
5 embodiments, in which the UE performs the final selection, and in embodiments in which the network performs the final selection. Therefore, the amount of signalling is lower than in the solutions according to the prior art.

The name of a given functional entity, such as the radio network controller, is often
10 different in the context of different cellular telecommunication systems. For example, in the GSM system the functional entity corresponding to a radio network controller (RNC) is the base station controller (BSC). Therefore, the term radio network controller is intended to cover all corresponding functional entities regardless of the term used for the entity in the particular cellular telecommunication
15 system. Further, the various command names such as the XXX_COMMAND command name are intended to be examples only, and the invention is not limited to using the command names recited in this specification.

The term mobile station is used in the claims to denote a UE or a corresponding mobile communication means.

20 In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention. While a preferred embodiment of the invention has been described in detail, it should be apparent that many modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention as defined in the appended
25 claims.

Claims

1. A method for use in a cellular telecommunications network for selection of a cell for use by a mobile station in a cell-connected state, said cellular telecommunications network comprising a plurality of radio access networks having cells, said cells being grouped into registrations areas, and said mobile station having a plurality of states, said states comprising an idle-mode state; a registration-area-connected state, the location of a mobile station in which state is known to the cellular telecommunications network on a registration area level; and a cell-connected state, the location of a mobile station in which state is known to the cellular telecommunications network on a cell level, **characterised** in that cell identification information is attached as a parameter to a message initiating the change of the mobile station to the cell-connected state, and in that the method comprises steps, in which
 - the network selects (104, 105) a cell to be suggested as the cell for use by the mobile station in the cell-connected state, and
 - the network indicates (110) said cell by attaching cell identification information as a parameter to said message.
2. A method according to claim 1, **characterized** in that said message is an RRC message.
3. A method according to claim 1, **characterised** in that the method comprises steps, in which
 - the mobile station selects (140) a cell for use in the cell-connected state, and
 - the mobile station indicates (150) the selected cell by attaching cell identification information as a parameter to a second message.
4. A method according to claim 3, **characterised** in that in the step, in which the mobile station selects a cell, the selection is made from a set of cells comprising cells known by the mobile station and said cell indicated by the network.
5. A method according to claim 1, **characterised** in that the method comprises a step, in which the network selects a cell of the active set of the mobile station to be a default cell to be suggested to the mobile station.

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 49489/SKU/PKK	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/FI00/00187	International filing date (day/month/year) 10/03/2000	Priority date (day/month/year) 10/03/1999	
International Patent Classification (IPC) or national classification and IPC H04Q7/38			
Applicant NOKIA NETWORKS OY et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 6 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 03/10/2000	Date of completion of this report 18.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Le Bras, P Telephone No. +49 89 2399 8819



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/FI00/00187

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-7 as originally filed
3a,8 with telefax of 13/03/2001

Claims, No.:

1-5 with telefax of 13/03/2001

Drawings, sheets:

1/2,2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/FI00/00187

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-5
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-5
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-5
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Claim 1 relates to a method for use in a UMTS cellular telecommunications network for selection of a cell for use by a mobile station.

Prior art: it is acknowledged in the description.

D1= US-A-5 707 096 also acknowledged in the description is a technical background.

Problem:

A third generation UE can be in many different states in relation to the network. If no connections are present, the *UE* is in the idle mode. When at least one signalling connection exists, the UE is in connected mode. The connected mode has two main states: an URA connected state and a cell connected state. In the URA connected state, the position of the UE is known on URA (UMTS Registration Area) level. In the cell connected state, the position of the UE is known in the cell level. All data transmission is effected in the cell connected state. From the viewpoint of radio resource allocation, a UE in connected mode i. e. when RRC connections *exist* has two main states: dedicated channel state (DCH) and common channel state (CCH).

In dedicated channel state the UE uses dedicated radio interface resources for the connection with UTRAN. There is one dedicated radio link for each cell included in the Active Set, i. e. the set of cells used by the UE. The Active Set may contain one or more cells.

In common channel state the UE shares a common channel with other users. The common channel state the UE may be in *RACH/FACH* or *RACH/PCH* substates. In *RACH/FACH* state the position of the UE is known at cell level, i. e. the UE is always connected to one cell. In *RACH/PCH* state the position of the UE is known either at cell level or at URA level.

DCH to CCH state transition may occur but necessitates a heavy signalling handshake and thus a long time.

Solution:

The invention reduces the amount of signalling *between* the UE and the network, since the selection of cell as claimed reduces the amount of processing in the UE and in the network. This is very important regarding the UE, since any messaging over the radio interface consumes energy, which is a critical resource in typical battery-operated mobile handsets. The invention also reduces delay in changing from DCH to CCH state, since the time spent in messaging is reduced along with the messaging.

The invention can be advantageously applied in third generation cellular systems, such as the UMTS (Universal Mobile *Telecommunication* System) or the IMT2000 cellular system.

The solution is neither known nor drivable from the known prior art, it complies with the requirements of Article 33(3) PCT.

2. Claims 2 to 5 also comply with the requirements of Article 33(3) PCT as claims dependent of claim 1.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/FI00/00187

Re Item VIII

Certain observations on the international application

1. The vague and imprecise statement in the description on page 8, I.24 (spirit of the invention) implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, PCT/GL/3 III, 4.3a).

REPLACED BY
ART 34 A2007

The present invention has several advantages. For example, according to the inventive method, the UE does not need to perform signalling when entering a new cell as a result of a DCH to CCH state change. Since according to the invention, the cell to be selected is identified before the state change, no signalling is needed in the new cell for identification of the selected cell. This advantage is obtained both in embodiments, in which the UE performs the final selection, and in embodiments in which the network performs the final selection. Therefore, the amount of signalling is lower than in the solutions according to the prior art.

The name of a given functional entity, such as the radio network controller, is often different in the context of different cellular telecommunication systems. For example, in the GSM system the functional entity corresponding to a radio network controller (RNC) is the base station controller (BSC). Therefore, the term radio network controller is intended to cover all corresponding functional entities regardless of the term used for the entity in the particular cellular telecommunication system. Further, the various command names such as the XXX_COMMAND command name are intended to be examples only, and the invention is not limited to using the command names recited in this specification.

The term mobile station is used in the claims to denote a UE or a corresponding mobile communication means.

In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention. While a preferred embodiment of the invention has been described in detail, it should be apparent that many modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention.

Claims

1. In a cellular telecommunications network, a method for selection of a cell for use by a mobile station in a cell-connected state, characterised in that cell identification information is attached as a parameter to a message initiating the change of the mobile station to the cell-connected state.
5
2. A method according to claim 1, characterised in that the method comprises steps, in which
 - the network selects a cell to be suggested as the cell for use by the mobile station in the cell-connected state, and
 - 10 - the network indicates said cell by attaching cell identification information as a parameter to said RRC message.
3. A method according to claim 1, characterised in that the method comprises steps, in which
 - the mobile station selects a cell for use in the cell-connected state, and
 - 15 - the mobile station indicates the selected cell by attaching cell identification information as a parameter to a second RRC message.
4. A method according to claims 2 and 3, characterised in that in the step, in which the mobile station selects a cell, the selection is made from a set of cells comprising cells known by the mobile station and said cell indicated by the network.
20
5. A method according to claim 2, characterised in that the method comprises a step, in which the network selects a cell of the active set of the mobile station to be a default cell to be suggested to the mobile station.

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REC'D 20 JUN 2001

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

16

Applicant's or agent's file reference 49489/SKU/PKK	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/FI00/00187	International filing date (day/month/year) 10/03/2000	Priority date (day/month/year) 10/03/1999
International Patent Classification (IPC) or national classification and IPC H04Q7/38		
Applicant NOKIA NETWORKS OY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 6 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 03/10/2000	Date of completion of this report 18.06.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Le Bras, P Telephone No. +49 89 2399 8819



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI00/00187

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-7	as originally filed	
3a,8	with telefax of	13/03/2001

Claims, No.:

1-5	with telefax of	13/03/2001
-----	-----------------	------------

Drawings, sheets:

1/2,2/2	as originally filed
---------	---------------------

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI00/00187

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-5
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-5
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-5
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Claim 1 relates to a method for use in a UMTS cellular telecommunications network for selection of a cell for use by a mobile station.

Prior art: it is acknowledged in the description.

D1= US-A-5 707 096 also acknowledged in the description is a technical background.

Problem:

A third generation UE can be in many different states in relation to the network. If no connections are present, the *UE* is in the idle mode. When at least one signalling connection exists, the UE is in connected mode. The connected mode has two main states: an URA connected state and a cell connected state. In the URA connected state, the position of the UE is known on URA (UMTS Registration Area) level. In the cell connected state, the position of the UE is known in the cell level. All data transmission is effected in the cell connected state. From the viewpoint of radio resource allocation, a UE in connected mode i. e. when RRC connections *exist* has two main states: dedicated channel state (DCH) and common channel state (CCH).

In dedicated channel state the UE uses dedicated radio interface resources for the connection with UTRAN. There is one dedicated radio link for each cell included in the Active Set, i. e. the set of cells used by the UE. The Active Set may contain one or more cells.

In common channel state the UE shares a common channel with other users. The common channel state the UE may be in *RACH/FACH* or *RACH/PCH* substates. In *RACH/FACH* state the position of the UE is known at cell level, i. e. the UE is always connected to one cell. In *RACH/PCH* state the position of the UE is known either at cell level or at URA level.

DCH to CCH state transition may occur but necessitates a heavy signalling handshake and thus a long time.

Solution:

The invention reduces the amount of signalling *between* the UE and the network, since the selection of cell as claimed reduces the amount of processing in the UE and in the network. This is very important regarding the UE, since any messaging over the radio interface consumes energy, which is a critical resource in typical battery-operated mobile handsets. The invention also reduces delay in changing from DCH to CCH state, since the time spent in messaging is reduced along with the messaging.

The invention can be advantageously applied in third generation cellular systems, such as the UMTS (Universal Mobile *Telecommunication* System) or the IMT2000 cellular system.

The solution is neither known nor drivable from the known prior art, it complies with the requirements of Article 33(3) PCT.

2. Claims 2 to 5 also comply with the requirements of Article 33(3) PCT as claims dependent of claim 1.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/FI00/00187

Re Item VIII

Certain observations on the international application

1. The vague and imprecise statement in the description on page 8, I.24 (spirit of the invention) implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, PCT/GL/3 III, 4.3a).

3a

Patent publication US 5,707,096, for example, discusses mobile station initiated cell update procedures in cellular telecommunication networks, where a mobile station has various common channel modes. It discloses a system and method for maintaining control channel mode status information for a mobile station. Following
5 reselection of a new cell by the mobile station, or selection of a new analog or digital operating mode, the system described in said publication notifies a mobile switching center of the mobile station's identity and its current control channel mode.

The present invention has several advantages. For example, according to the inventive method, the UE does not need to perform signalling when entering a new cell as a result of a DCH to CCH state change. Since according to the invention, the cell to be selected is identified before the state change, no signalling is needed in the new cell for identification of the selected cell. This advantage is obtained both in 5 embodiments, in which the UE performs the final selection, and in embodiments in which the network performs the final selection. Therefore, the amount of signalling is lower than in the solutions according to the prior art.

The name of a given functional entity, such as the radio network controller, is often 10 different in the context of different cellular telecommunication systems. For example, in the GSM system the functional entity corresponding to a radio network controller (RNC) is the base station controller (BSC). Therefore, the term radio network controller is intended to cover all corresponding functional entities regardless of the term used for the entity in the particular cellular telecommunication 15 system. Further, the various command names such as the XXX_COMMAND command name are intended to be examples only, and the invention is not limited to using the command names recited in this specification.

The term mobile station is used in the claims to denote a UE or a corresponding mobile communication means.

20 In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention. While a preferred embodiment of the invention has been described in detail, it should be apparent that many modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention as defined in the appended 25 claims.

Claims

1. A method for use in a cellular telecommunications network for selection of a cell for use by a mobile station in a cell-connected state, said cellular telecommunications network comprising a plurality of radio access networks having
5 cells, said cells being grouped into registrations areas, and said mobile station having a plurality of states, said states comprising an idle-mode state; a registration-area-connected state, the location of a mobile station in which state is known to the cellular telecommunications network on a registration area level; and a cell-
10 cellular telecommunications network on a cell level, characterised in that cell identification information is attached as a parameter to a message initiating the change of the mobile station to the cell-connected state, and in that the method comprises steps, in which
- the network selects (104, 105) a cell to be suggested as the cell for use by the
15 mobile station in the cell-connected state, and
 - the network indicates (110) said cell by attaching cell identification information as a parameter to said message.
2. A method according to claim 1, characterized in that said message is an RRC message.
- 20 3. A method according to claim 1, characterised in that the method comprises steps, in which
- the mobile station selects (140) a cell for use in the cell-connected state, and
 - the mobile station indicates (150) the selected cell by attaching cell identification information as a parameter to a second message.
- 25 4. A method according to claim 3, characterised in that in the step, in which the mobile station selects a cell, the selection is made from a set of cells comprising cells known by the mobile station and said cell indicated by the network.
5. A method according to claim 1, characterised in that the method comprises a step, in which the network selects a cell of the active set of the mobile station to be a
30 default cell to be suggested to the mobile station.

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

BERGGREN OY AB
P.O. Box 16
00101 Helsinki
FINLANDE

Berggren Oy Ab

15 -12- 2000

PCT

WRITTEN OPINION

(PCT Rule 66)

Applicant's or agent's file reference 49489/SKU/PKK		Date of mailing (day/month/year) 13.12.2000 <i>fr. 13/12-01</i>
International application No. PCT/FI00/00187		REPLY DUE within 3 month(s) from the above date of mailing <i>per</i>
International filing date (day/month/year) 10/03/2000	Priority date (day/month/year) 10/03/1999	
International Patent Classification (IPC) or both national classification and IPC H04Q7/38		
Applicant NOKIA NETWORKS OY et al.		

1. This written opinion is the first drawn up by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain document cited
 - VII ☒ Certain defects in the international application
 - VIII ☒ Certain observations on the international application
3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
 For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
 For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: **10/07/2001**.

Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer / Examiner Le Bras, P <hr/> Formalities officer (incl. extension of time limits) Finnie, A Telephone No. +49 89 2399 8251
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WRITTEN OPINION

International application No. PCT/FI00/00187

I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

Description, pages:

1-8 as originally filed

Claims, No.:

1-5 as originally filed

Drawings, sheets:

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

WRITTEN OPINION

International application No. PCT/FI00/00187

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	
Inventive step (IS)	Claims	1-5 NO
Industrial applicability (IA)	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Claim 1 does not comply with the requirements of Article 33(3) PCT for the following reasons:

It is known from the general UMTS knowledge that the Air interface of UMTS uses two major types of transport channels:

- i) Common Control Channels comprising the following channels: BCH, FACH, PCH, RACH,
- ii) Dedicated channels comprising: DCH and DSCH.

BCH is a cell-wide channel used to broadcast system and cell-specific information, it therefore obvious that this channel, i.e. also the CCH to which BCH belong to, is generally used to transport cell identification information as in claim 1. No significant technical difference between the subject-matter of claim 1 and the basic UMTS knowledge can be detected.

The subject-matter of claim 1 appears thus to merely results from the basic UMTS knowledge and does not involve an inventive step.

2. In the same manner, dependent claims appear to comprise additional subject-matter resulting from general knowledge in UMTS field and do not comply with the requirements of Article 33(3) PCT.

Re Item VII

Certain defects in the international application

1. Reference is made to the following documents:

D1:US-A-5 797 096

2. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
3. The applicant has acknowledged a prior art in the introductory part of the description, he is kindly requested to identify a document representing this prior art. If this is not possible D1 should be identify in the description (Rule 5.1(a)(ii) PCT).
4. The vague and imprecise statement in the description on page 8, I.24 (spirit of the invention) implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them (see also the PCT Guidelines, PCT/GL/3 III, 4.3a).

Re Item VIII

Certain observations on the international application

1. The requirements of Article 6 PCT are not fulfilled for the following reasons:
 - 1.1 The formulation of claim 1: "In a system...a method..." should not be used since it introduces a lack of clarity as to the category of the claim. A formulation of the type: "A method for selection... for use in a cellular system.." would be appropriate.
 - 1.2 Claim 2 makes reference to "said RRC message" which does not have any antecedent, rendering the claim unclear, contrary to Article 6 PCT.
For sake of clarity claim 1 should recite: " RRC message".
 - 1.3 Claim 4 as appended to claim 2 is not clear, since it makes reference to the step in which the mobile selects a cell which does not exist in claim 2.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 49489	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> FOR FURTHER ACTION </div> <div style="width: 55%; font-size: small;"> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. </div> </div>	
International application No. PCT/FI 00/00187	International filing date (<i>day/month/year</i>) 10 March 2000	(Earliest) Priority Date (<i>day/month/year</i>)
Applicant NOKIA NETWORKS OY et al.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).

2. ☐ Unity of invention is lacking (See Box II).

3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.
☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ transcribed by this Authority.

4. With regard to the title, ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:

Figure No. 4

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.
☐ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00187

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5797096 A (F. LUPIEN ET AL.), 18 August 1998 (18.08.98), column 1, line 28 - line 40; column 2, line 17 - line 20, figure 3, abstract --	1-5
A	EP 0785696 A2 (HITACHI, LTD.), 23 July 1997 (23.07.97), abstract --	1-5
A	EP 0639036 A2 (R.J.G. MACNAMEE), 15 February 1995 (15.02.95), page 4, line 10 - line 15; page 5, line 24 - line 28; page 5, line 41 - line 43, abstract --	1-5

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

8 August 2000

Date of mailing of the international search report

04.09.2000

Name and mailing address of the International Searching Authority
European Patent Office P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
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Fax: (+31-70) 340-3016

Authorized officer

ELISABET ASELIUS/AE
Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

SA 273008

02/12/99

International application No.
PCT/FI 00/00187

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	5797096	A	18/08/98	AU	6473696 A	26/02/97
				JP	11510658 T	14/09/99
				WO	9705752 A	13/02/97

EP	0785696	A2	23/07/97	AU	689398 B	26/03/98
				AU	1016497 A	28/08/97
				CN	1166116 A	26/11/97
				JP	9200858 A	31/07/97
				JP	9205673 A	05/08/97

EP	0639036	A2	15/02/95	NONE		

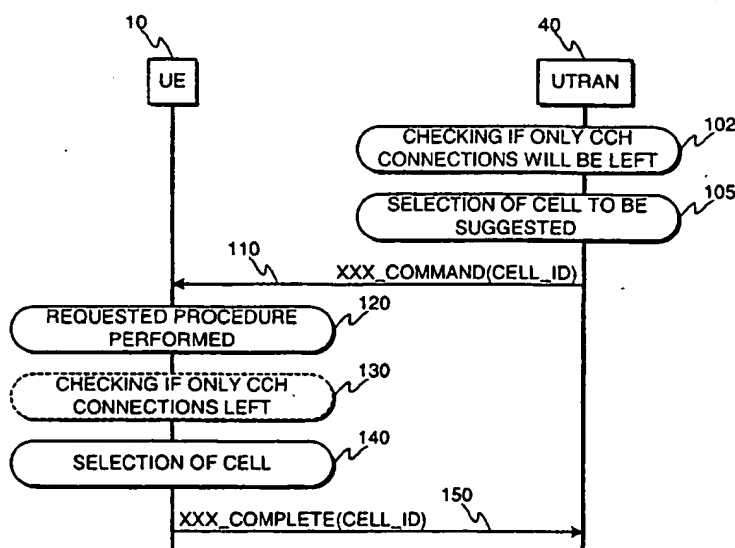
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(21) International Application Number: PCT/FI00/00187 (22) International Filing Date: 10 March 2000 (10.03.00) (30) Priority Data: 990526 10 March 1999 (10.03.99) FI (71) Applicant (for all designated States except US): NOKIA NETWORKS OY [FI/FI]; P.O. Box 300, FIN-00045 Nokia Group (FI). (72) Inventors; and (75) Inventors/Applicants (for US only): <u>VIALEN</u> , Jukka [FI/FI]; Tyrskykuja 3 B 13, FIN-02320 Espoo (FI). <u>LONGONI</u> , Fabio [IT/FI]; Visamäki 5 E 38, FIN-02130 Espoo (FI). <u>HONKASALO</u> , Zhi-Chun [GB/FI]; Martankuja 10, FIN-02700 Kauniainen (FI). (74) Agent: BERGGREN OY AB; P.O. Box 16, FIN-00101 Helsinki (FI).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. (88) Date of publication of the international search report: 16 November 2000 (16.11.00)	

(54) Title: A CELL SELECTION METHOD



(57) Abstract

The invention is directed to a method for cell selection in a cellular telecommunication system. According to the invention, cell identification information is attached as a parameter to an RRC message initiating the state change of the mobile station to the cell-connected state. Advantageously, the network selects a cell to be suggested as the cell for use by the mobile station in the cell-connected state, and the network indicates said cell by attaching cell identification information as a parameter to said RRC message. Consequently, the mobile station may make the final selection of the cell, and indicate the selected cell to the network by attaching cell identification information as a parameter to a second RRC message, such as the response message to the RRC message initiating the state change.

A cell selection method

TECHNICAL FIELD OF THE INVENTION

The invention is directed to a method for cell selection in a cellular tele-
5 communication system. More precisely the invention is directed to a method
described in the preamble of the first independent method claim.

BACKGROUND OF THE INVENTION

Some of the abbreviations used in this application are as follows:

	CCCH	Common Control Channel
10	DCCH	Dedicated Control Channel
	DRNC	Drift Radio Network Controller
	DTCH	Dedicated Traffic Channel
	FACH	Forward Link Access Channel
	IMSI	International Mobile Subscriber Identity
15	PCCH	Paging Control Channel
	PCH	Paging Channel
	PLMN	Public Land Mobile Network
	P-TMSI	Packet Temporary Mobile Subscriber Identity
	RACH	Random Access Channel
20	RNC	Radio Network Controller
	RNTI	Radio Network Temporary Identity
	RRC	Radio Resource Control
	TMSI	Temporary Mobile Subscriber Identity
	UE	User Equipment
25	UMTS	Universal Mobile Telecommunication System
	UTRAN	UMTS Terrestrial Radio Access Network

For clarification of common terms used in this document, an overview of certain
cellular telecommunication system configurations is presented in the following.

Proposals for third-generation systems include UMTS (Universal Mobile Tele-
30 communications System) and FPLMTS/IMT-2000 (Future Public Land Mobile
Telecommunications System / International Mobile Telecommunications at 2000
MHz). In these plans cells are categorised according to their size and characteristics

into pico-, nano-, micro- and macrocells, and an example of the service level is the bit rate. The bit rate is the highest in picocells and the lowest in macrocells. The cells may overlap partially or completely and there may be different terminals so that not all terminals necessarily are able to utilise all the service levels offered by the cells.

Figure 1 shows an exemplary block diagram of a possible structure of a third generation cellular network. Such networks typically comprise a core network 50 connected to one or more radio access networks 40 (RAN). Such radio access networks are often referred to as UTRAN networks (UMTS Terrestrial Radio Access Network). The radio access networks typically comprise at least a plurality of base stations 20a,20b,20c (BS) for realizing the radio connections to mobile stations 10a,10b, and at least one radio network controller 30 (RNC) for controlling the base stations. The radio network controllers are connected to a mobile switching center (MSC) 60 in the core network.

A third generation UE can be in many different states in relation to the network. If no connections are present, the UE is in the idle mode. When at least one signalling connection exists, the UE is in connected mode. The connected mode has two main states: an URA connected state and a cell connected state. In the URA connected state, the position of the UE is known on URA (UMTS Registration Area) level. An URA consists of a plurality of cells within a certain geographical area. In the cell connected state, the position of the UE is known in the cell level. All data transmission is effected in the cell connected state.

From the viewpoint of radio resource allocation, a UE in connected mode i.e. when RRC connections exist has two main states: dedicated channel state (DCH) and common channel state (CCH).

In dedicated channel state the UE uses dedicated radio interface resources for the connection with UTRAN. There is one dedicated radio link for each cell included in the Active Set, i.e. the set of cells used by the UE. The Active Set may contain one or more cells.

In common channel state the UE shares a common channel with other users. The common channel state the UE may be in RACH/FACH or RACH/PCH substates. In RACH/FACH state the position of the UE is known at cell level, i.e. the UE is always connected to one cell. In RACH/PCH state the position of the UE is known either at cell level or at URA level.

DCH to CCH state transition may occur for example as a result of the following RRC procedures:

- Transport channel reconfiguration, in which a transport channel is changed from a dedicated to a common channel, for example for a NRT bearer.
- 5 - Radio access bearer (RAB) release, in which at least one bearer is released, and the last remaining one is a non-real time (NRT) bearer which is currently not active or is which is configured to use common channels.
- Physical channel reconfiguration, which procedure may assign, replace or release a set of physical channels used by an UE. A physical channel
10 reconfiguration procedure may also change the used transport channel type and RRC state.
- Radio access bearer (RAB) reconfiguration, in which parameters for a radio access bearer or a signalling link are reconfigured to reflect a change in required QoS level. A RAB reconfiguration procedure may comprise for example
15 changing of RLC parameters, changing of multiplexing priority for DTCH/DCCH, changing of DCH scheduling priority, changing of TFS for DCH, change of TFCS, assigning or releasing of physical channel(s) and changing of used transport channel types.

20 The signalling in the case of the four previous procedures is similar: they are started by the serving RNC which sends a XXX message to the UE, which replies with a XXX Complete message, in which XXX refers to the particular procedure in question.

25 In the transition from DCH to CCH - cell connected state, the cell that will be initially used in the CCH state needs to be selected and indicated. A known way of selecting and indicating the initial cell is the use of a cell update procedure started by the UE. In this method the UE selects the cell, and sends a cell update message using the RACH channel of the selected cell. The network replies by sending a cell update confirm message via the corresponding FACH channel. This solution causes too much signalling on the RACH/FACH channels. Further, the UE may not know
30 all details which affect the optimality of the cell selection. For example, the network may for various reasons prefer that the UE selects a macro cell, or a cell that is controlled by the SRNC.

Another known solution is that the XXX complete message is sent by the UE on the RACH channel of the selected cell after the DCH is released. In this case the XXX Complete message should be acknowledged by the network to ensure that the message has gone through, which results in a similar signalling load as the cell
5 update method.

SUMMARY OF THE INVENTION

An object of the invention is to realize a method, which reduces the amount of signalling associated with DCH to CCH state change. A further object of the invention is to realize a method, which allows reduction of the time needed for a
10 DCH to CCH state change.

The objects are reached by arranging the network to suggest a cell to be used by the UE in the CCH state, and by indicating the cell as a parameter to the RRC command, which initiates the DCH to CCH state change.

The method according to the invention is characterized by that, which is specified in
15 the characterizing part of the independent method claim. The dependent claims describe further advantageous embodiments of the invention.

According to the invention, cell identification information is attached as a parameter to a RRC message initiating the state change of the mobile station to the cell-connected state. Advantageously, the network selects a cell to be suggested as the
20 cell for use by the mobile station in the cell-connected state, and the network indicates said cell by attaching cell identification information as a parameter to said RRC message. Consequently, the mobile station may make the final selection of the cell, and indicate the selected cell to the network by attaching cell identification information as a parameter to a second RRC message, such as the response message
25 to the RRC message initiating the state change.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described in more detail in the following with reference to the accompanying drawings, of which

Figure 1 illustrates a network structure according to prior art,

30 Figure 2 illustrates signalling according to an advantageous embodiment of the invention,

Figure 3 illustrates signalling according to an advantageous embodiment of the invention, and

Figure 4 illustrates signalling according to an advantageous embodiment of the invention.

5 Same reference numerals are used for similar entities in the figures.

DETAILED DESCRIPTION

Figure 2 illustrates signalling according to an advantageous embodiment of the invention. Figure 2 shows a UE 10 and UTRAN 40, and illustrates signalling between them. In the first step 110, UTRAN sends a command XXX_COMMAND to initiate a RRC procedure, in which XXX refers to the particular procedure in question. After receiving the command, the UE performs 120 any necessary actions according to the requested procedure. In this embodiment, UE next checks 130, if only CCH connections are left. In this example, only CCH connections are found to be left after the completed RRC procedure. Consequently, the UE selects 140 a cell to be indicated as the location cell of the UE in the CCH cell connected state, and sends 150 a XXX_COMPLETE message back to UTRAN to indicate that the requested RRC procedure is complete, attaching cell identification information CELL_ID as a parameter to the XXX_COMPLETE message. Preferably, the UE sends the XXX_COMPLETE message on the DCH channel before releasing the DCH channel.

The RRC procedure referred to in the previous paragraph and in the rest of this specification with the XXX_COMMAND and XXX_COMPLETE messages may be any RRC procedure, which may result in a transition of the UE from DCH to CCH state. Examples of procedures are transport channel reconfiguration, radio access bearer (RAB) release, physical channel reconfiguration, and radio access bearer (RAB) reconfiguration, which were described in the previous description of prior art.

Figure 3 illustrates signalling according to a further advantageous embodiment of the invention. In this embodiment, the network selects the cell used in the CCH state. Before initiating the necessary RRC procedure, the network checks 102 if only CCH connections will be left after the procedure. If that is the case, as it is in this example, the network selects 104 the cell to be indicated as the location of the UE in the CCH state. Next, the network initiates the desired RRC procedure by sending 110 a XXX_COMMAND to the UE, attaching identification information of

the selected cell CELL_ID as a parameter to the XXX_COMMAND message. After receiving the XXX_COMMAND message, the UE performs 120 the requested RRC procedure, and replies by sending 150 a XXX_COMPLETE message back to the network. The UE may send the CELL_ID information as a parameter of the
 5 XXX_COMPLETE message back to the network.

Figure 4 illustrates signalling according to an advantageous embodiment of the invention. In this embodiment, the network suggests to the UE the cell used in the CCH state. Before initiating the necessary RRC procedure, the network checks 102 if only CCH connections will be left after the procedure. If that is the case, as it is in
 10 this example, the network selects 104 the cell to be suggested to the UE as the location of the UE in the CCH state. Next, the network initiates the desired RRC procedure by sending 110 a XXX_COMMAND to the UE, attaching identification information of the suggested cell CELL_ID as a parameter to the XXX_COMMAND message. After receiving the XXX_COMMAND message, the
 15 UE performs 120 the requested RRC procedure.

In this embodiment, the UE may perform checking 130, if only CCH connections still exist after the RRC procedure. However, the inclusion of a CELL_ID parameter to the XXX_COMMAND may in various embodiments of the invention be taken as an indication, that only CCH connections are left, in which case a cell needs to be
 20 selected.

Next, the UE selects the cell to be used as the location of the UE in the CCH state. The UE may take into account the suggestion of the network, if it so chooses. However, the UE may have preferences, for example set by the user of the UE, about which cells are to be preferred. Based on for example such information, the
 25 UE may select another cell than the one suggested by the network. Thus the UE can select the cell from a set of cells comprising the cell indicated by the network and any other cells otherwise known by the UE, for example such as those belonging to the active set or those cells whose identification signals the UE can currently receive. After this, the UE sends 150 a XXX_COMPLETE message back to the
 30 network. The UE sends identification information CELL_ID of the selected cell to the network as a parameter of the XXX_COMPLETE message.

In the previous examples, the network element originating the XXX_COMMAND messages and receiving the XXX_COMPLETE messages, i.e. the network element comprising the RRC protocol entities in the UTRAN, is typically a radio network
 35 controller (RNC).

- In a further advantageous embodiment of the invention, a cell of the active set i.e. of those cells in use by the UE is appointed as a default cell. In such an embodiment, the cell does not need to be identified in the XXX_COMMAND and XXX_COMPLETE message, since a default cell is already known. The
- 5 communication of the default cell is in such a case effected with messaging associated with updating of the active set. This feature can in various embodiments of the invention be used in combination with the previously described features. For example, in one embodiment of the invention the network always suggests the default cell to the UE, but the UE makes the final decision by itself.
- 10 The invention reduces the amount of signalling between the UE and the network, since the selection of cell does not incur more messaging, as the known solutions do. Further, the invention reduces amount of processing in the UE and in the network, since amount of messaging is decreased. This is very important regarding the UE, since any messaging over the radio interface consumes energy, which is a
- 15 critical resource in typical battery-operated mobile handsets. The invention also reduces delay in changing from DCH to CCH state, since the time spent in messaging is reduced along with the messaging.

The invention can be advantageously applied in third generation cellular systems, such as the UMTS (Universal Mobile Telecommunication System) or the IMT2000

20 cellular system.

- In the previous embodiments, in which the network suggests or selects a cell to be used in the CCH state, the network may base the selection of the cell for example on information specific to the network, such as to select a cell under control of the serving RNC. The network may for example also select a macro cell i.e. a cell with
- 25 a relatively large area to avoid the situation, in which the UE selects a microcell i.e. a cell with a very small area, in which case the network would most probably have to perform a handover for the connection or the connections of the UE very soon.

- If the cell selected to be used in the CCH state is already in the active set i.e. the set of cells used by the UE when the cell selection is performed, the selected cell can in various embodiments of the invention be indicated by radio link identification information LINK_ID instead of cell identification information CELL_ID. In such a case, the network can indicate a cell to the UE by attaching the radio link identification information LINK_ID to the XXX_COMMAND message. Similarly, the UE can indicate a cell to the network by attaching the radio link identification
- 30 information LINK_ID to the XXX_COMPLETE message.
- 35

The present invention has several advantages. For example, according to the inventive method, the UE does not need to perform signalling when entering a new cell as a result of a DCH to CCH state change. Since according to the invention, the cell to be selected is identified before the state change, no signalling is needed in the new cell for identification of the selected cell. This advantage is obtained both in
5 embodiments, in which the UE performs the final selection, and in embodiments in which the network performs the final selection. Therefore, the amount of signalling is lower than in the solutions according to the prior art.

The name of a given functional entity, such as the radio network controller, is often
10 different in the context of different cellular telecommunication systems. For example, in the GSM system the functional entity corresponding to a radio network controller (RNC) is the base station controller (BSC). Therefore, the term radio network controller is intended to cover all corresponding functional entities regardless of the term used for the entity in the particular cellular tele-
15 communication system. Further, the various command names such as the XXXX_COMMAND command name are intended to be examples only, and the invention is not limited to using the command names recited in this specification.

The term mobile station is used in the claims to denote a UE or a corresponding mobile communication means.

20 In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention. While a preferred embodiment of the invention has been described in detail, it should be apparent that many modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention.

Claims

1. In a cellular telecommunications network, a method for selection of a cell for use by a mobile station in a cell-connected state, characterised in that cell identification information is attached as a parameter to a message initiating the change of the mobile station to the cell-connected state.
5
2. A method according to claim 1, characterised in that the method comprises steps, in which
 - the network selects a cell to be suggested as the cell for use by the mobile station in the cell-connected state, and
 - 10 - the network indicates said cell by attaching cell identification information as a parameter to said RRC message.
3. A method according to claim 1, characterised in that the method comprises steps, in which
 - the mobile station selects a cell for use in the cell-connected state, and
 - 15 - the mobile station indicates the selected cell by attaching cell identification information as a parameter to a second RRC message.
4. A method according to claims 2 and 3, characterised in that in the step, in which the mobile station selects a cell, the selection is made from a set of cells comprising cells known by the mobile station and said cell indicated by the network.
20
5. A method according to claim 2, characterised in that the method comprises a step, in which the network selects a cell of the active set of the mobile station to be a default cell to be suggested to the mobile station.

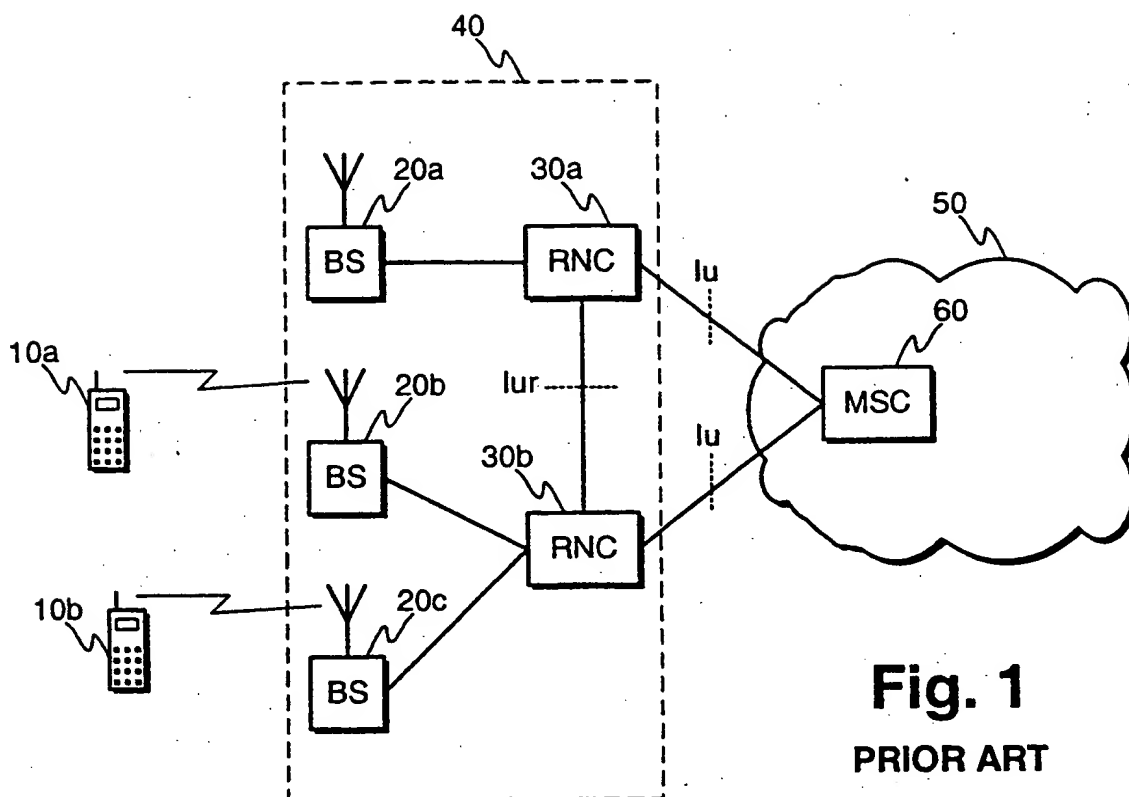


Fig. 1
PRIOR ART

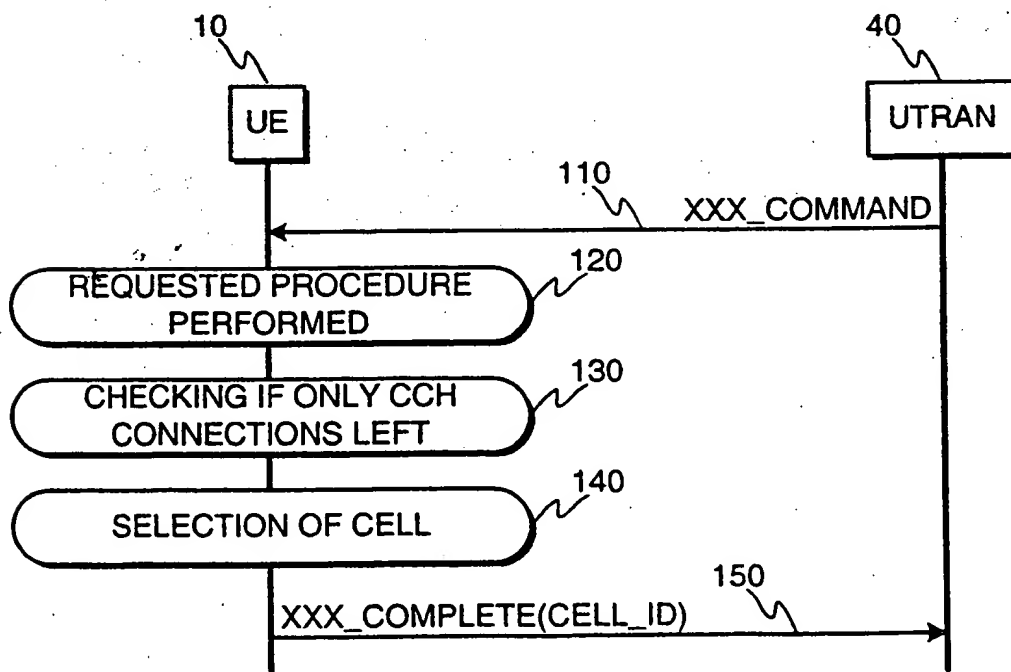


Fig. 2

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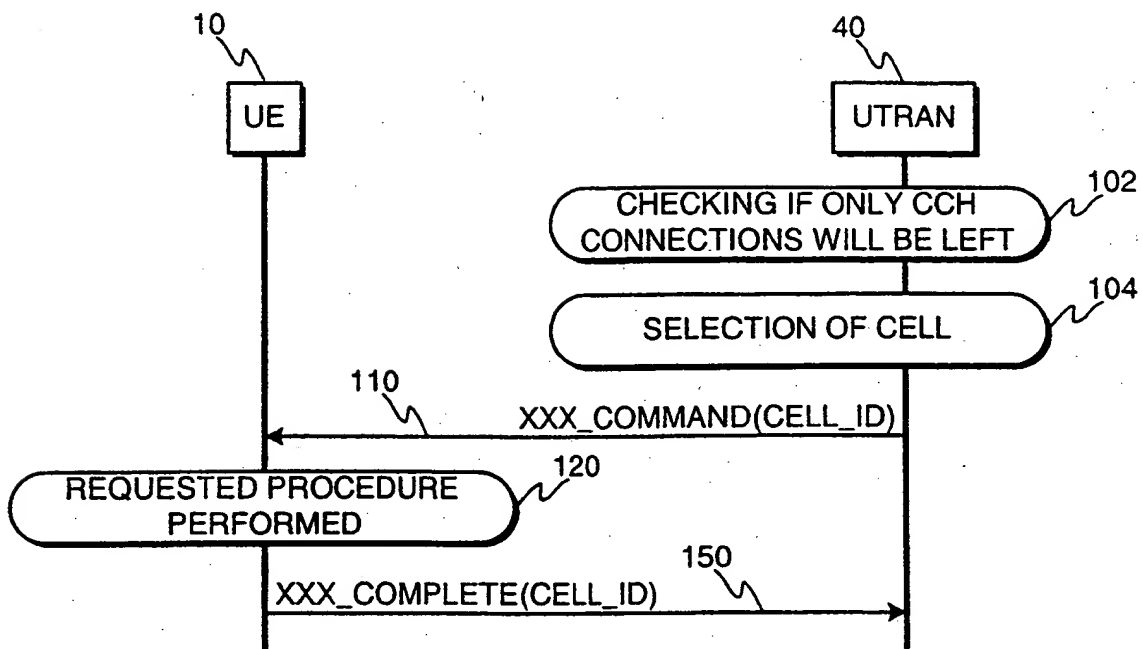


Fig. 3

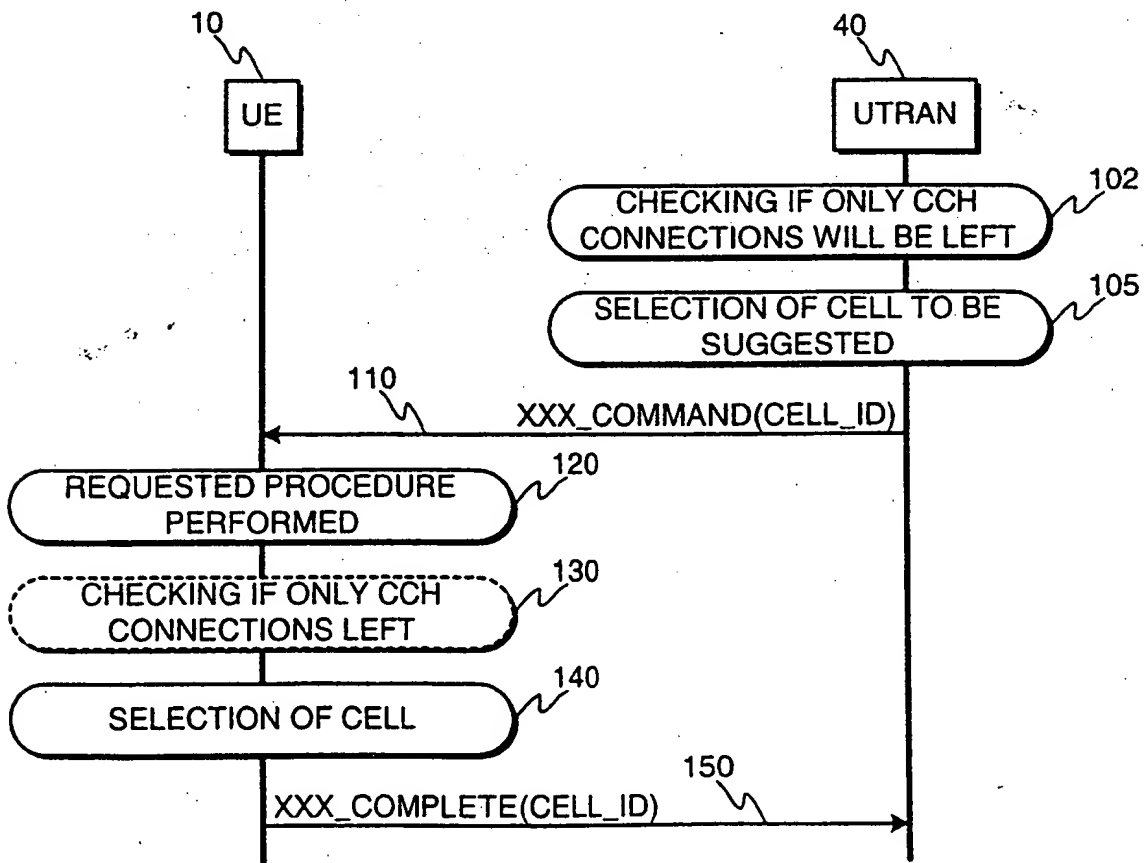


Fig. 4

INTERNATIONAL SEARCH REPORT

1

International application No.

PCT/FI 00/00187

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5797096 A (F. LUPIEN ET AL.), 18 August 1998 (18.08.98), column 1, line 28 - line 40; column 2, line 17 - line 20, figure 3, abstract --	1-5
A	EP 0785696 A2 (HITACHI, LTD.), 23 July 1997 (23.07.97), abstract --	1-5
A	EP 0639036 A2 (R.J.G. MACNAMEE), 15 February 1995 (15.02.95), page 4, line 10 - line 15; page 5, line 24 - line 28; page 5, line 41 - line 43, abstract --	1-5

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

- * Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

8 August 2000

Name and mailing address of the International Searching Authority
European Patent Office P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk

Date of mailing of the international search report

04.09.2000

Authorized officer

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9510922 A1 (NOKIA TELECOMMUNICATIONS OY ET AL.), 20 April 1995 (20.04.95), page 3, line 22 - page 4, line 5, figure 3, abstract -- -----	1-5

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/FI 00/00187

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EP 0639036 A2	15/02/95	NONE	
WO 9510922 A1	20/04/95	AU 673294 B AU 7785094 A CN 1115593 A EP 0673586 A GB 2282730 A,B JP 8504314 T US 5659598 A	31/10/96 04/05/95 24/01/96 27/09/95 12/04/95 07/05/96 19/08/97